

XLV.—*On a new Specimen of the Clupeoid Fish Aulolepis typus from the English Chalk.* By A. SMITH WOODWARD, F.L.S.

[Plate IX. figs. 2, 2 a.]

WHEN describing the Cretaceous Clupeoid fish *Aulolepis typus*, Ag., five years ago\*, I referred to this species one specimen in the British Museum (no. P. 1854) which had already been labelled as belonging to it by Agassiz. This fossil showed a considerable portion of the skull, and proved to be identical with two other specimens in the British Museum displaying the head in a still better state of preservation. The latter (nos. 49903, P. 5681) were thus determined as also belonging to *Aulolepis typus*, and the characters of the cranial roof and branchiostegal apparatus were both described and figured. It now appears from a still more satisfactorily preserved specimen, undoubtedly of this species, in the Woodwardian Museum, Cambridge, that the three fossils just enumerated were wrongly ascribed to the fish in question. The skull therefore needs an amended description, and the new facts necessitate a reconsideration of the precise systematic position of the genus *Aulolepis*.

The Woodwardian fossil was obtained from the Lower Chalk of Southeram, near Lewes, and, thanks to the kindness of Prof. McKenny Hughes and Mr. Henry Woods, I have had the privilege of studying it in connexion with the British Museum collection.

The cranium is well exposed from above (fig. 2 a), and some of the principal sutures are distinct. The supraoccipital bone (*s.occ.*) is relatively small, with a median vertical crest on its hinder face. Its upper portion enters the cranial roof, but does not completely separate the parietals (*pa.*), which are much extended antero-posteriorly and meet in the middle line for more than half of their length. The squamosal-pterotic region (*sq.*) also seems to be relatively large, but is not in the same plane as the parietals, sinking into a fossa which deeply impresses the hinder portion of the cranial roof on either side. The frontals (*fr.*) are very large, widest in the interorbital region and rapidly tapering in front, where the small mesethmoid (*m.*) projects beneath them. None of these bones are ornamented. Of the cheek-plates only part

\* Proc. Zool. Soc. 1894 (1895), p. 660, pl. xliii. figs. 2-6.

of an antorbital is preserved (fig. 2, *a.o.*), but this is interesting as exhibiting downwardly-radiating branches from the slime-canal which traverses it. There are remains of the two large supramaxillæ (*s.mx.*) overlapping the maxilla (*mx.*), of which the convex oral border is beset with minute teeth. The rather stout premaxillæ must clearly have met in the middle line, and that of the right side exhibits a considerably extended oral face with the bases of attachment for a cluster of minute teeth. The mandible (*md.*) is fragmentary, but its articulation is shown beneath the hinder border of the orbit. The deep and narrow preoperculum (*p.op.*) has a straight vertical anterior margin which is somewhat thickened. The lower limb of this bone is small, and from its angle there are a few radiating ridges. The operculum (*op.*) is delicate and deeper than broad, and a few of the characteristic cycloidal scales extend both over this bone and over the cheek. Of the trunk only the lower portion is preserved, but this is complete to the base of the caudal fin (*c.*). There are remains of the comparatively small pectoral fins (*pect.*) well on the flank, while the bases of the very stout pelvic fins (*plv.*) are seen on the somewhat flattened ventral aspect slightly further back. Each of the latter comprises at least eight or nine robust rays, of which only the undivided proximal ends are preserved. The anal fin (*a.*) is small, arising about midway between the pelvic and caudal fins. The cycloidal scales are rather thick, and merely exhibit the concentric lines of growth without any posterior crenulations or serrations.

Comparing the specimen now described with those in the British Museum which were referred to *Aulolepis typus* in 1895, it is evident that only those numbered 47932 and P. 4247 were rightly determined. Nos. 49903, P. 1854, and P. 5681 probably belong to a small species of *Osmeroides*, which will be discussed in part iv. of the British Museum 'Catalogue of Fossil Fishes.' It now appears that the skull of *Aulolepis* is intermediate in characters between that of the typical Elopidae and that of the typical Clupeidae. The supraoccipital bone enters the cranial roof, though not completely separating the parietals, while the lateral muscles of the trunk must have extended well forwards over the sides of the skull above the laterally projecting otic region. There is no evidence of a gular plate; indeed it was probably absent, for the branchiostegal rays are distinctly few in number. The jaws are typically Clupeoid. The trunk is comparatively short, much laterally compressed, and covered with rather large cycloid scales, while the fins are exactly as

described on the former occasion, the pelvic pair being relatively large and advanced far forwards.

*Aulolepis* may therefore be placed in the family Clupeidæ, and in the primitive section which is characterized by the absence of ventral ridge-scales. Careful comparisons seem to show that its nearest ally is the Cretaceous genus *Otenothrissa*\*, from which it differs in the non-pectination of the scales and in the relatively smaller size of the pelvic and dorsal fins.

EXPLANATION OF PLATE IX. FIGS. 2, 2a.

Fig. 2. *Aulolepis typus*, Ag.; imperfect fish, left lateral aspect, nat. size. Lower Chalk; Southeram, near Lewes. [Woodwardian Museum, Cambridge.] 2a. Upper view of skull of same specimen, nat. size.

*a.*, anal fin; *a.o.*, antorbital; *c.*, base of caudal fin; *fr.*, frontals; *m.*, mesethmoid; *md.*, mandible; *mx.*, maxilla; *op.*, operculum; *p.op.*, preoperculum; *pa.*, parietal; *pect.*, pectoral fin; *plv.*, pelvic fin; *s.mx.*, supramaxillæ; *s.occ.*, supraoccipital; *sq.*, squamosal.

XLVI.—*British Amphipoda: Families Pontoporeidæ to Ampelisidæ.* By Canon NORMAN, M.A., D.C.L., LL.D., F.R.S., &c.†

THIS revision of species of British Amphipoda is intended primarily to give an account of specimens which have passed through my hands and have been identified by myself. Species may have been procured from districts which have been worked by others and recorded; but if they are also in my collection I give my own authority for them. Multiplication of exact habitats of less rare species would too greatly extend the space occupied by distribution, while my own record will have the advantage of confirming that previously made. A carcinologist desiring to be acquainted with the fauna of a particular district will naturally consult the papers which have been published on the restricted area. These observations more especially refer to the Clyde district, in which I first dredged in 1854, and which I have visited many times since, a district which has been so admirably worked as

\* A. S. Woodward, *Ann. & Mag. Nat. Hist.* [7] vol. iii. (1899) p. 490.  
† See for preceding paper 'Annals,' Feb. 1900, p. 196.